

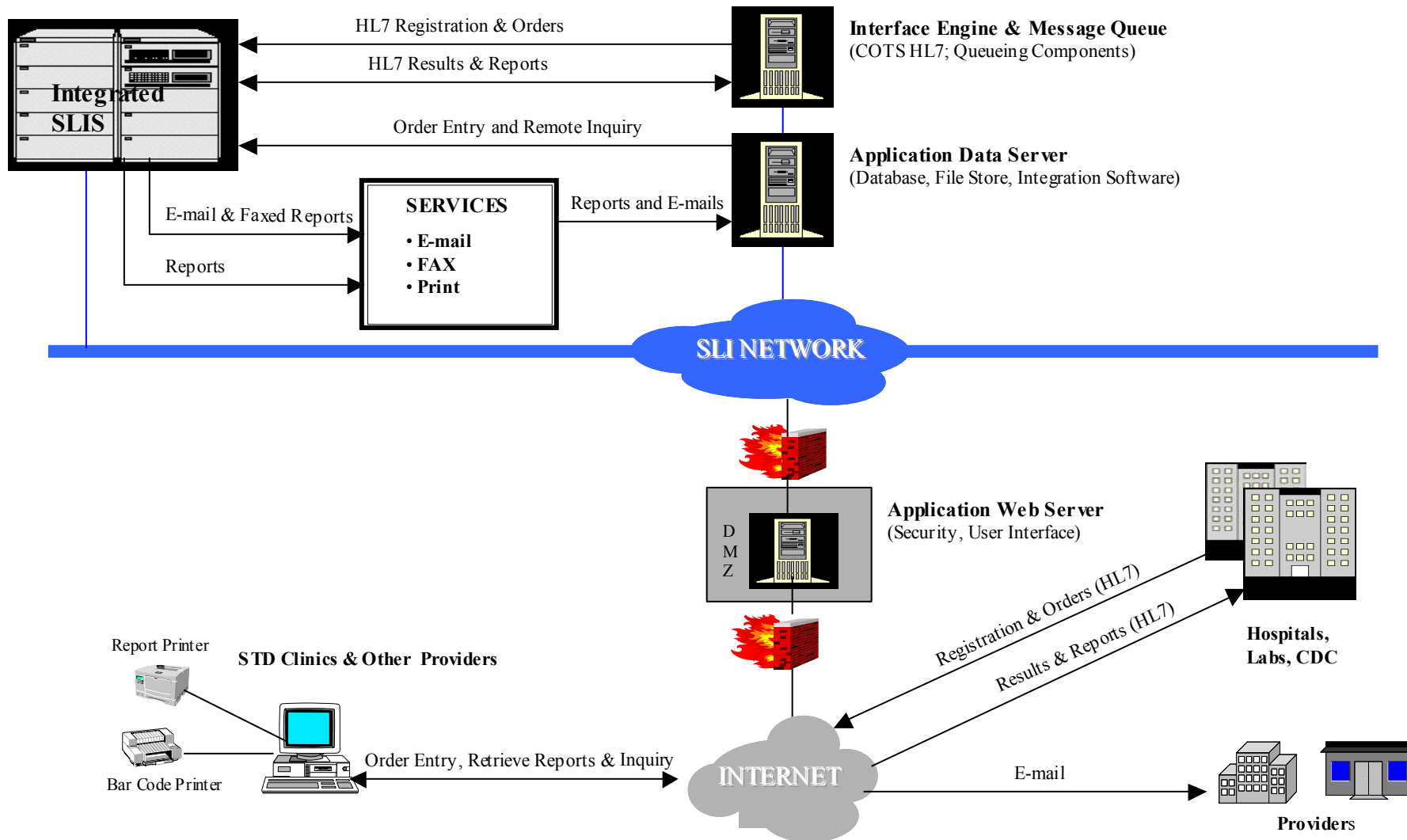
# Electronic Laboratory Reporting and Communication

The Massachusetts State Laboratory  
Institute

A Conceptual Design

# Current Method





# State Laboratory Integrated Information System (SLIS)

- STD Laboratory Component (Deployment June 2003)
- Core Laboratory Component (Deployment June 2003)
- N-tier architecture (SQL, VB, ASP)
- Centralized Tables
- Data elements based on NEDSS Data Standards

# Development Methodology



- Initially used “waterfall” approach
- Modified RUP
  - RequisitePro
  - Rose
  - Test Manager
  - ClearQuest

# Electronic Laboratory Communication and Reporting Component (ELR)

- An extranet application that extends SLIS functionality securely to the Internet
- Remote Order Entry (ROE) and Reporting
- Standardized data exchange with organizations (HL7, LOINC, SNOMED)
- Reception of remote orders from hospitals sending specimen batches to the State Laboratory Institute (SLI) (HL7)

- The SLIS-ELR Component will be developed with 5-6 pilot sites using 5 reportable diseases to refine and validate requirements.
- It is expected that larger provider sites have a means to exchange files and process HL7 messages
- Small sites such as clinics, jails, etc..will benefit from ROE
- Structure of ELR HL7 interface will likely be batch file transfers.
- Will use a common set of messages that can support a variety of hospital systems (Meditech, SunQuest, Cerner and “home-grown”)

# SLIS-ELR Technical Architecture Requirements (Conceptual Design Stage)

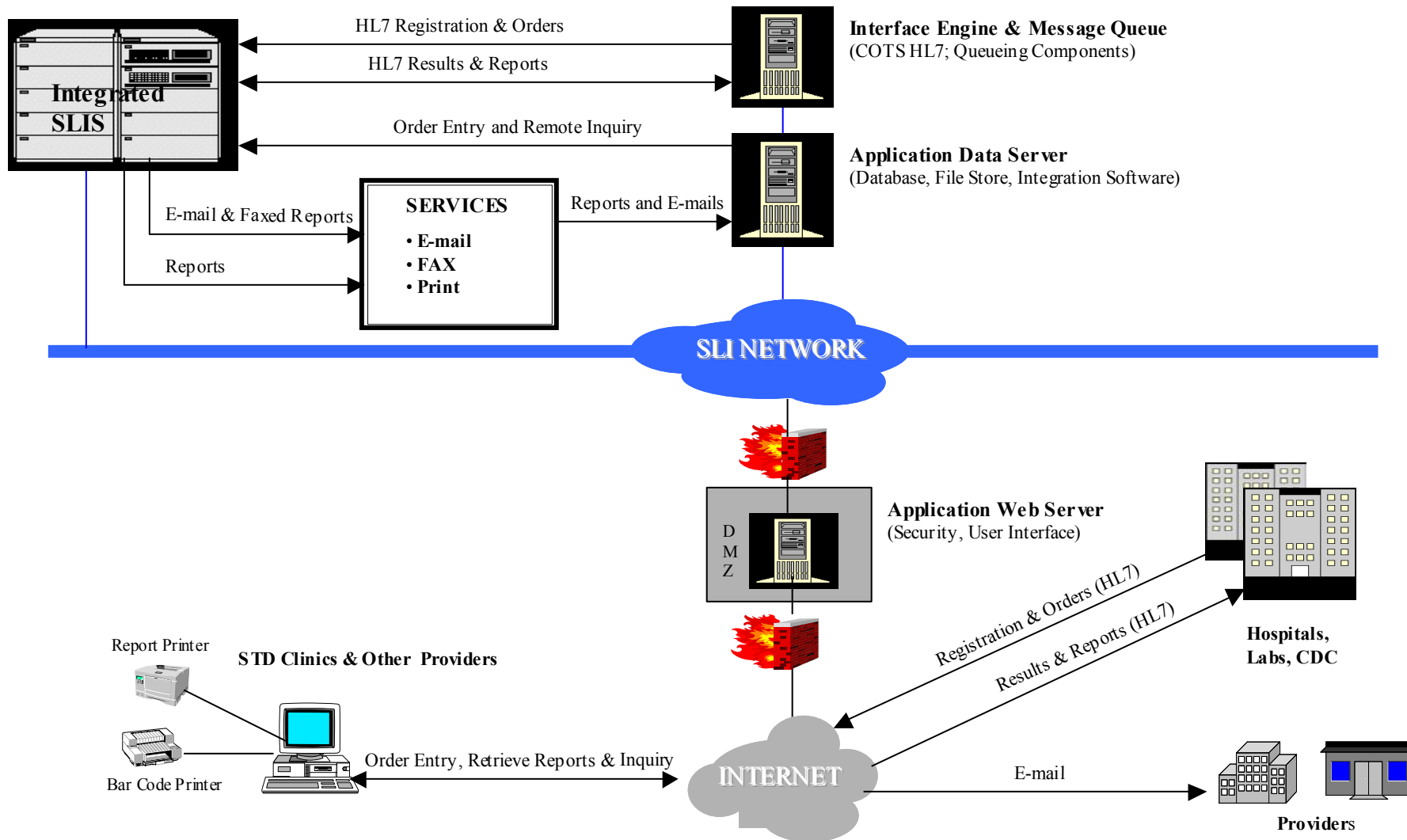
- N-tier system with the following functional areas:
  - ✓ Hardware
  - ✓ Communication
  - ✓ Application Software



# Hardware

- Clients- PC with web-browser
- Web Interface- web application between ELR back-end and Internet. General Web Services
- App Data Server- managing orders after entry and holding files data for distribution, managing role-based permissions. Security buffer PHI not on Web server for any length of time
- Interface Engine- COTS for transmission and reception of HL7 messages and data
- Network- Based Communications Server- SLIS network to support print, automated fax transmissions and clear text e-mail notification





# Communications

- Internet Communications: **Commonwealth's Internet connection and firewall protection.**
- ELR and SLIS will be connected on the wide area network (WAN).
- Network-based utilities:
  - Automated fax COTS
  - Clear-text e-mail notification : use of HAN Portal, HAN Clients generally ELR Clients

# Standard Messaging

- Interface engine that converts data to and from providers in HL7 format
- Investigate use of HL7 Version 3.0 which includes XML formats
- Use standard HL7 message formats when possible to avoid custom message formats
- Include message queuing capability to support provider LIMS as they interface with SLIS
- Logical queuing mechanism and secure batch file transfer is envisioned for data transport.

# Standard Messaging

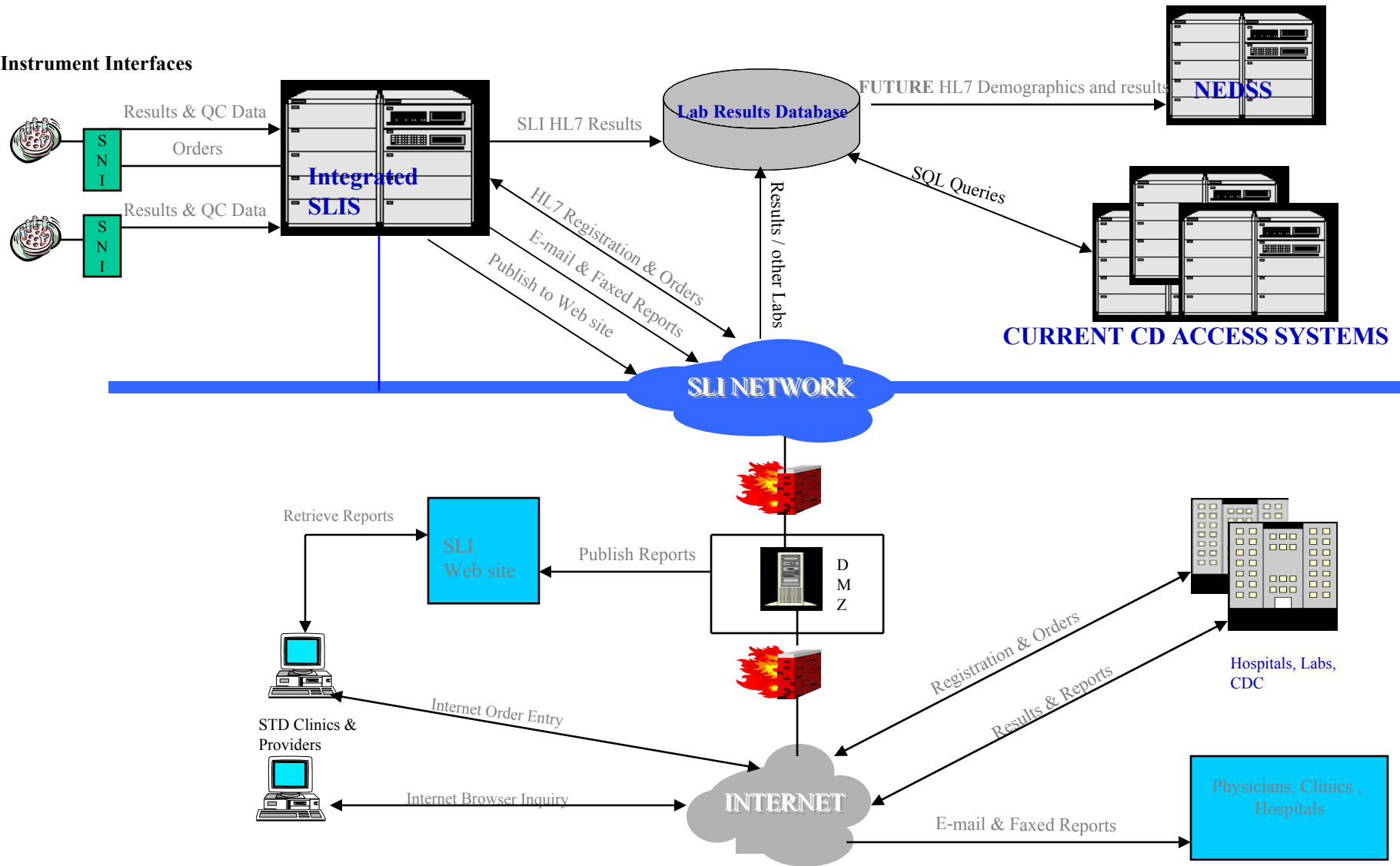
- Possible use of Microsoft MQ that would sit on a messaging server.
- Microsoft MQ would be used for incoming and out going messages( orders and reports)
- Use of Simple Object Access Protocol (SOAP) to allow Java and COM to talk to each other.
- Conceptually HL7 Order Entry messages arriving via batch file would be “unwrapped” and queued for processing by SLIS
- Similarly, lab results and report messages would be queued for “wrapping” in a batch file to be transmitted to providers (hospitals)

# Data Repository

- **Cleanse Data (before entry into database or before sending to CD)**
  - Check for duplicates
  - All data modifiers i.e. LOINC, SNOMED.
  - Data formatting.
- **Use With Current CD Access Systems**
  - Allow for SQL queries to capture data needed.
  - Allow data mining of for patterns.
- **Future Use**
  - Allow for HL7 transfer of data to NEDSS.

# Conceptual Design for Capturing Lab Data for CD Use

## Instrument Interfaces



# Software Environment

- Client software- web browsers that is capable of HTTPS and SSL, with 128-bit encryption.
  - Support client-side certificates if chosen as method for second tier authentication (HIPAA)
- Application Development Software- will be chosen in next phase “Detailed Design”.  
Use of .NET?



# Software Environment

- Integrated COTS Software:
  - A variety of COTS products will be investigated for use in SLIS-ELR.
  - Investigation, selection and integration with the ELR Component will be part of the Detailed Design Phase.
- Interface Engine: must support a wide variety of message types and versions of the HL7 standard
- Published Reports: Portable Document Format (PDF) for consistency, can include privacy and integrity controls and a web standard.

# Next Steps:

CD Bureau  
and other  
health  
partners



State  
Laboratory

- Refine Conceptual Design move towards Detailed Design
- Review requirements with Communicable Disease Bureau, selected pilot sites and other health information partners
- Investigate use of web interface platforms (dedicated ELR server? HAN portal? or DPH Secure Gateway?)
- Review software technology including technical benefits, maturity, security and relative costs related to support and development
- Review HL7 message exchange requirements with pilot sites

# THE END?

